Notice of Allowability	Application No.	Applicant(s)	
	10/713,340	CHIANG, RICHARD Y.	
	Examiner	Art Unit	
	Douglas N. Washburn	2863	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to *filing of 14 November 2003*.

2. ☒ The allowed claim(s) is/are *1-26*.

3. ☒ The drawings filed on *14 November 2003* are accepted by the Examiner.

4. ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
   a) ☐ All b) ☐ Some* c) ☐ None of the:
      1. ☐ Certified copies of the priority documents have been received.
      2. ☐ Certified copies of the priority documents have been received in Application No. _____ .
      3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

   * Certified copies not received: _____.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.
THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.

5. ☐ A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.

6. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
   (a) ☐ including changes required by the Notice of Draftsperson's Patent Drawing Review (PTO-948) attached
      1) ☐ hereto or 2) ☐ to Paper No./Mail Date _____.
   (b) ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date _____.

   Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).

7. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

Attachment(s)

1. ☒ Notice of References Cited (PTO-892)
2. ☐ Notice of Draftperson's Patent Drawing Review (PTO-948)
3. ☐ Information Disclosure Statements (PTO-1449 or PTO/SB/08), Paper No./Mail Date _____
4. ☐ Examiner's Comment Regarding Requirement for Deposit of Biological Material
5. ☐ Notice of Informal Patent Application (PTO-152)
6. ☒ Interview Summary (PTO-413), Paper No./Mail Date *0542005*.
7. ☒ Examiner's Amendment/Comment
8. ☐ Examiner's Statement of Reasons for Allowance
9. ☐ Other _____.

DETAILED ACTION

EXAMINER'S AMENDMENT

1 An examiner's amendment to the record appears below. Should the changes and/or additions be unacceptable to applicant, an amendment may be filed as provided by 37 CFR 1.312. To ensure consideration of such an amendment, it MUST be submitted no later than the payment of the issue fee.

Authorization for this examiner's amendment was given in a telephone interview with David Bowls on 1 March 2005.

Amend claim 8 as follows:

A statistics model for analyzing spacecraft attitude pointing stability in a jitter analysis, the statistics model having signals processed to accurately predict the pointing stability in flight comprising the steps of:

defining an ergodic random process statistically and mathematically;

creating a window averaging technique to slide through simulated signals;

building the statistics model;

loading statistics into a statistics metric and creating a probability density function (PDF);

and integrating the PDF to a probability distribution function and reading out a 3-σ pointing accuracy against requirements.

Amend claim 15 as follows:

A method for analyzing spacecraft attitude pointing stability in a jitter analysis by processing a limited number of signals to accurately predict the pointing stability in flight, the method comprising the steps of:

defining an ergodic random process statistically and mathematically creating a window averaging technique to slide through the simulated signals building the statistics models;

placing the statistics into a histogram and create the Probability Density Function (PDF);

and integrating the PDF to Probability Distribution function and read out the 3-$\underline{\sigma}$ pointing accuracy against the requirements.

Amend claim 23 as follows:

The signal processing scheme of claim 22 wherein [the] a phase recovery filter recovers [the] a phase stability margin.

Amend the specification as follows:

(0013) Figure 2 shows, according to one embodiment of the present invention, a random signal, for example, a normal [nosy] noisy signal with spikes, and a window T that slides along the horizontal axis, the horizontal axis is time t, the window T taking samples of the random signal at X(t), where the vertical axis is an amplitude.

(0024) One embodiment first defines a statistics metric in the window T 28 where T usually comes from pointing stability requirements. Then, a few statistical assumptions are needed to create the statistics model: original signal x(t) is a stationary random process; x(t) is ergodic, [engodic] ergodic means statistics taken in one time history equal statistics taken in different time histories.

Prior Art Cited

2 Slafer et al. (US 4,752,884) teaches a pointing apparatus for a dual-spin spacecraft utilizing. A digital processor estimates the spin rate and phase of a spinning portion from an inertial attitude reference time of arrival, estimates the relative spin rate and phase between the spinning portion and a despun portion from an index reference time of arrival, and estimates bearing friction bias torque on a motor controlling the pointing direction of the despun portion of the spacecraft. The spinning portion spin rate and phase estimates are added with the relative spin rate and phase estimates to produce an estimate of the despun portion spin rate and phase, and the despun portion spin rate and phase estimates and the friction bias torque estimates are subtracted from commanded despun portion spin rate, phase and friction bias torque states. Slafer is silent regarding compiling statistics using a statistical model to produce a probability density function; integrating the probability density function to produce a probability distribution function; and determining a pointing accuracy from the probability distribution function.

Li et al. (US 6,298,315) teaches a method and apparatus for decomposing timing jitter on arbitrary serial data sequences. Specifically, a method of decomposing timing jitter on a signal under test, such as an arbitrary serial data stream, by performing a statistical analysis on a group of measurements. Each measurement comprises a timing jitter value and an associated bit pattern representing the bits falling within an analysis window which window being successively located at a plurality of positions within the data stream. Li is silent regarding compiling statistics using a statistical

model to produce a probability density function; integrating the probability density function to produce a probability distribution function; and determining a pointing accuracy from the probability distribution function.

Wilstrup et al. (US 6,356,850) teaches a method, apparatus, and article of manufacture for analyzing jitter. Inter-symbol interference, duty cycle distortion, random jitter and periodic jitter are measured. The method includes the steps of obtaining measurements of the spans of a signal, generating variation measurements for each of the spans, transforming the variation estimates from a time domain to a frequency domain, and determining the random component and the periodic component of the jitter signal. Wilstrup is silent regarding compiling statistics using a statistical model to produce a probability density function; integrating the probability density function to produce a probability distribution function; and determining a pointing accuracy from the probability distribution function.

Kuyel (US 6,640,193) teaches a method for measuring internal jitter is disclosed. A signal is provided and split into an input signal and a clock signal. A first data set representing internal jitter and system noise is generated by measuring the input signal using a data converter. A second data set representing system noise is generated by measuring the input signal using the data converter. The internal jitter is computed using the variance of the first data set and the variance of the second data set. Kuyel is silent regarding compiling statistics using a statistical model to produce a probability density function; integrating the probability density function to produce a probability distribution function; and determining a pointing accuracy from the probability distribution function.

Yamaguchi et al. (US 2003/0125888) teaches a jitter estimating apparatus for calculating phase noise waveform of an input signal and for estimating a peak value, a peak-to-peak value and a worst value of jitter of the input signal, and probability to generate jitter based on the phase noise waveform. Timing jitter sequence, period jitter sequence, and cycle to cycle period jitter sequence of the input signal are calculated and the peak value and the peak to peak value for each jitter, as well as probability to generate jitter may be estimated. Yamaguchi is silent regarding determining a pointing accuracy from the probability distribution function.

Yamaguchi et al. (US 2003/0202573) teaches a measuring apparatus that includes a timing jitter calculator for calculating a first timing jitter sequence of a first signal and a second timing jitter sequence of a second signal; and a jitter transfer function estimator for calculating a jitter transfer function between the first and second signals based on frequency components of the first and second timing jitter sequences. The jitter transfer function estimator calculates the jitter transfer function, for a plurality of frequency component pairs each of which is formed by a frequency component of a timing jitter in the first timing jitter sequence and a frequency component of a timing jitter in the second timing jitter sequence which correspond to approximately equal frequencies, based on frequency component ratios of the timing jitters in the first and second timing jitter sequences. Yamaguchi is silent regarding determining a pointing accuracy from the probability distribution function.

Guenther (US 2004/0136450) teaches a method and apparatus for decomposing timing jitter on arbitrary serial data sequences. The method comprises performing a statistical analysis on a group of measurements, where each measurement comprises a timing jitter value and an associated bit pattern representing the bits falling within an analysis window, successively located at a plurality of positions within the data stream. Guenther is silent regarding determining a pointing accuracy from the probability distribution function.

Allowable Subject Matter

3 The following is an examiner's statement of reasons for allowance:

Claim 1 recites, in part, "using the statistical model to produce a probability density function; integrating the probability density function to produce a probability distribution function; and determining a pointing accuracy from the probability distribution function". This feature in combination with the remaining claimed structure avoids the prior art of record.

Claims 2-7 depend from claim 1.

Claim 8 recites, in part, "integrating the PDF to a probability distribution function and reading out a 3-σ pointing accuracy against requirements". This feature in combination with the remaining claimed structure avoids the prior art of record.

Claims 9-14 depend from claim 8.

Claim 15 recites, in part, "integrating the PDF to a probability distribution function and reading out a 3-σ pointing accuracy against requirements". This feature in combination with the remaining claimed structure avoids the prior art of record.

Claims 16-21 depend from claim 15.

Claim 22 recites, in part, "determining a pointing accuracy from the probability distribution function, the pointing accuracy is at 99.8% of the probability distribution function". This feature in combination with the remaining claimed structure avoids the prior art of record.

Claims 23-26 depend from claim 22.

It is these limitations, which are not found, taught or suggested in the prior art of record, and are recited in the claimed combination that makes these claims allowable over the prior art.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

Conclusion

4 Any inquiry concerning this communication or earlier communications from the examiner should be directed to Douglas N. Washburn whose telephone number is (571) 272-2284. The examiner can normally be reached on Monday through Thursday 6:30 AM - 4:30 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, John E. Barlow can be reached on (571) 272-2269. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR.

Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

DNW

MICHAEL NGHIEM
PRIMARY EXAMINER

3/3/05